2011

Water Quality Assessment: Goldstein Open Space and Walking Path

Water Quality Assessment, Goldstein Open Space & Walking Path, Randolph MA: Randolph High School

AP Environmental Science

Presented by:

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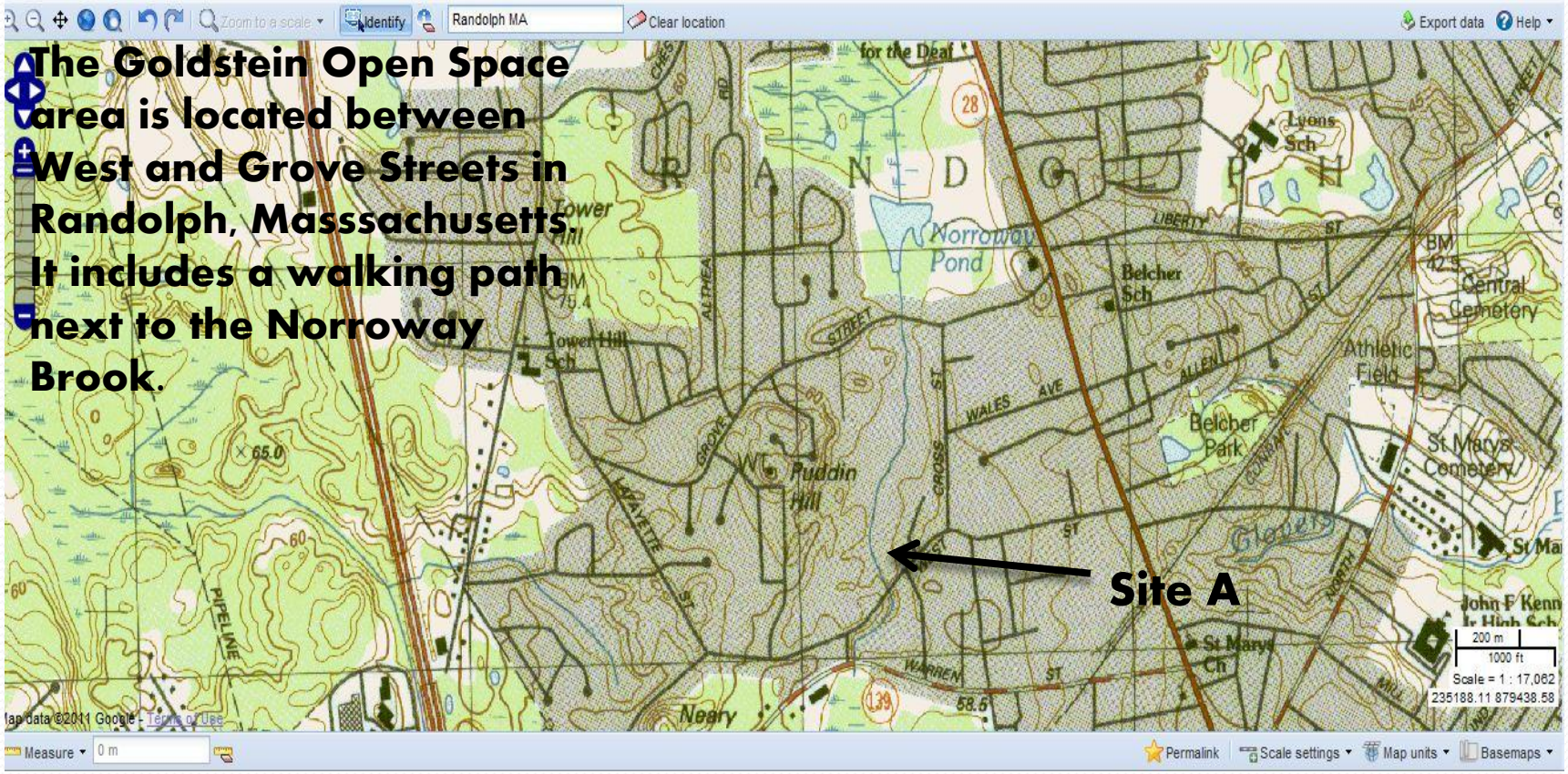
- Hieu Phung

Where is the Goldstein Open Space area?



Location

- Randolph MA

Located between West and Grove St.

Recording Physical Habitat

Jasmin Wilson

- Site Sketch
- Weather Conditions
- Dominate Vegetations
- Overhead Canopy

Vegetation

1. Oaks (mostly black and white)
2. Maples (mostly red)
3. Blueberry Bushes
4. American Chesnuts
5. Sassafras

Weather

- Partly Cloudy
- High 62 Low 31
- No precipitation

Why Monitor Water Quality?

- Monitoring water quality gives a good indication as to how healthy the ecosystem is and how it is impacted by human activities.
- The quality of the water determines what organisms one will find there.

Water Quality

- Water quality is the term that relates to not only the physical and chemical conditions of the water, but also how it is impacted by human activities and natural processes.

Taking Samples

- Students collected both water and macroinvertebrate samples that were later studied in class.

Macro Invertebrate Sampling!

- Left- India Santos
- Middle- Vicki Trinh
- Right Joseph Hubacheck

What Does the Macroinvertebrate Study Indicate?

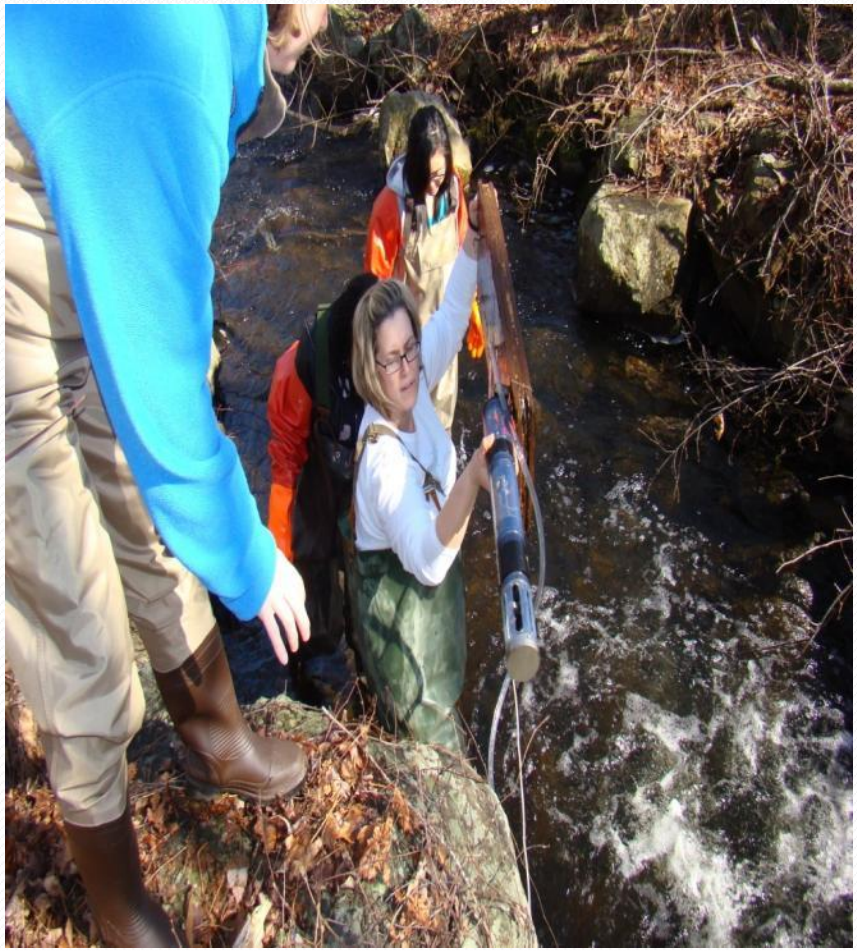
- Species Richness
- Species Density

Testing the Waters

- To determine the quality of the water, the following chemical tests were taken over a period of time:
  - Temperature
  - Dissolved Oxygen
  - %DO Saturated
  - pH
  - Phosphate
  - Nitrate

Deploying the Manta

- The Manta was placed in the water at the same time as the Sigma. The Manta took reading of the water as it passed by the probe.
- (pH, Temperature, Sp. Conductance , DO)



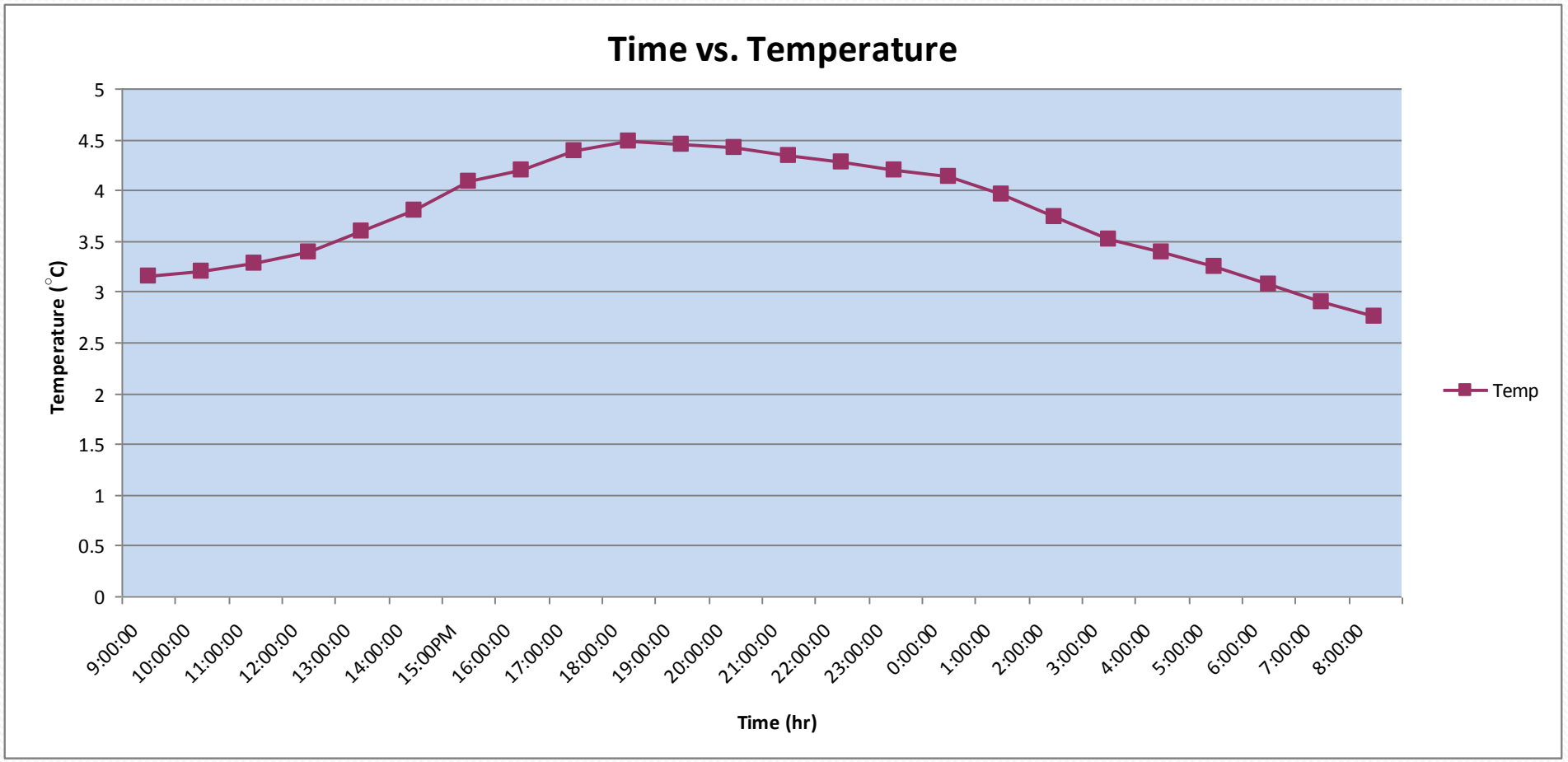
Deployment of Manta

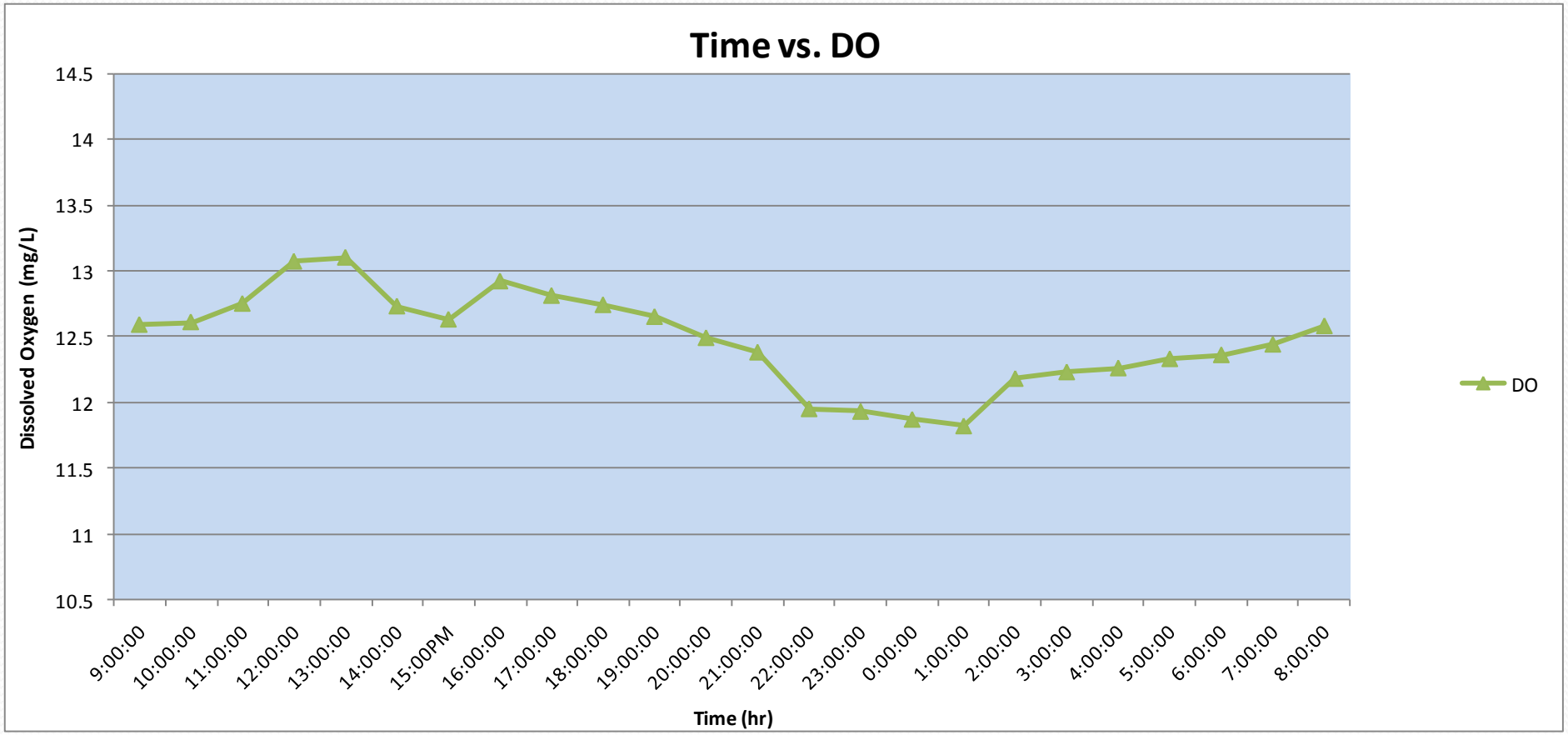
Sigma

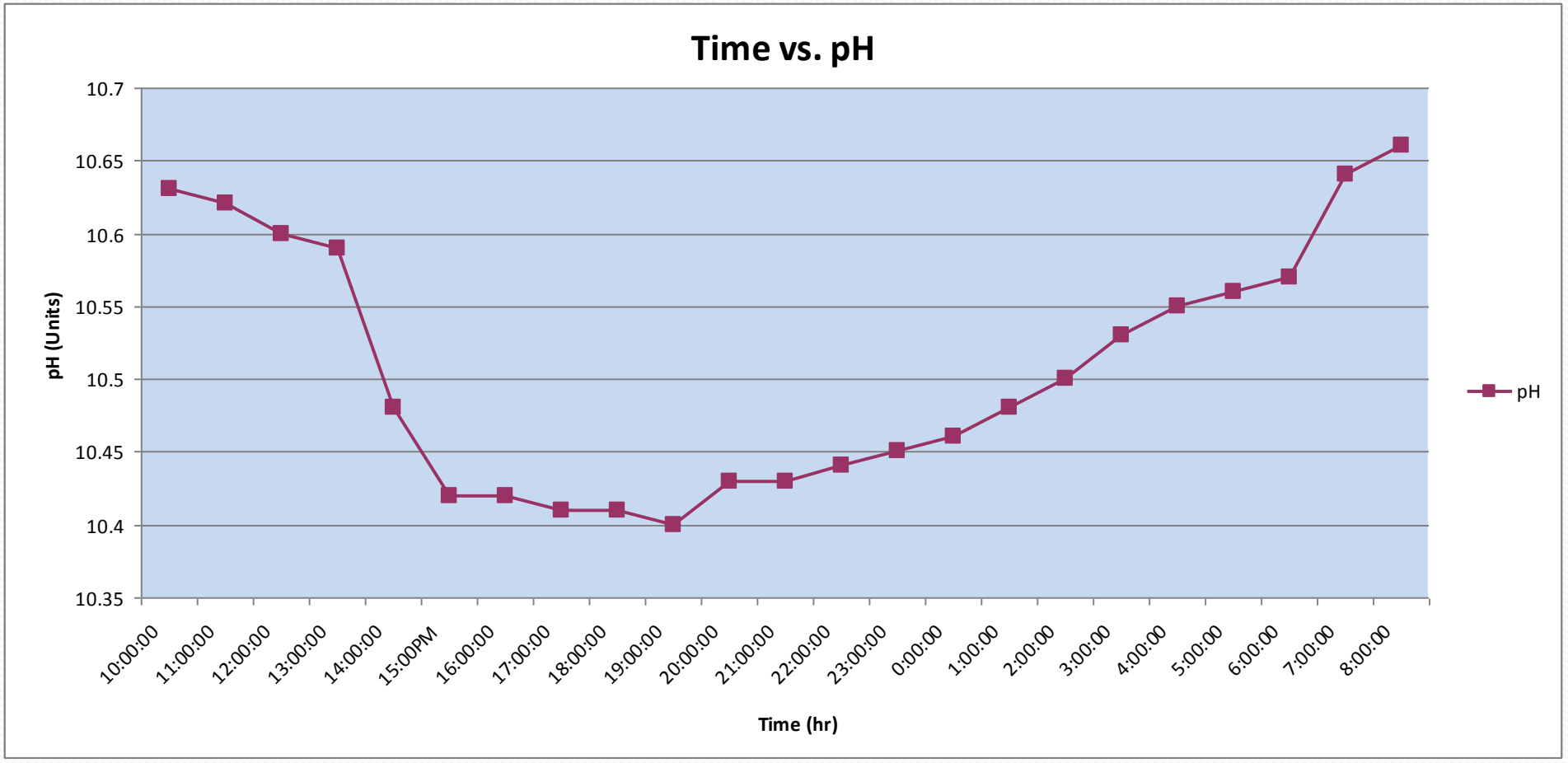
Sigma Protocol

- We took the Sigma and placed it at the Norroway River. The machine then collected water samples for 24 hrs on the hour. The purpose of using the Sigma was to check for phosphorous and Nitrogen. After collecting the water samples we then filtered the water .

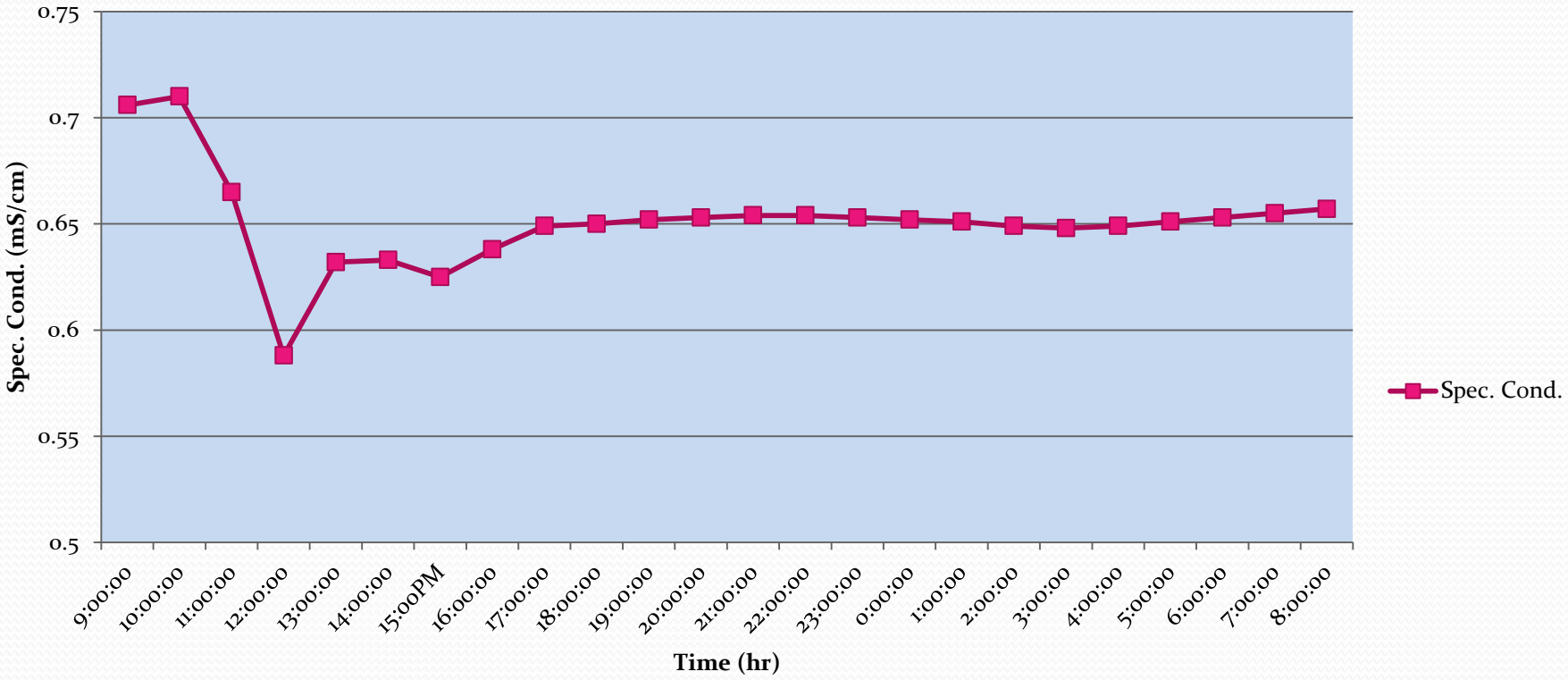
- And the Data…

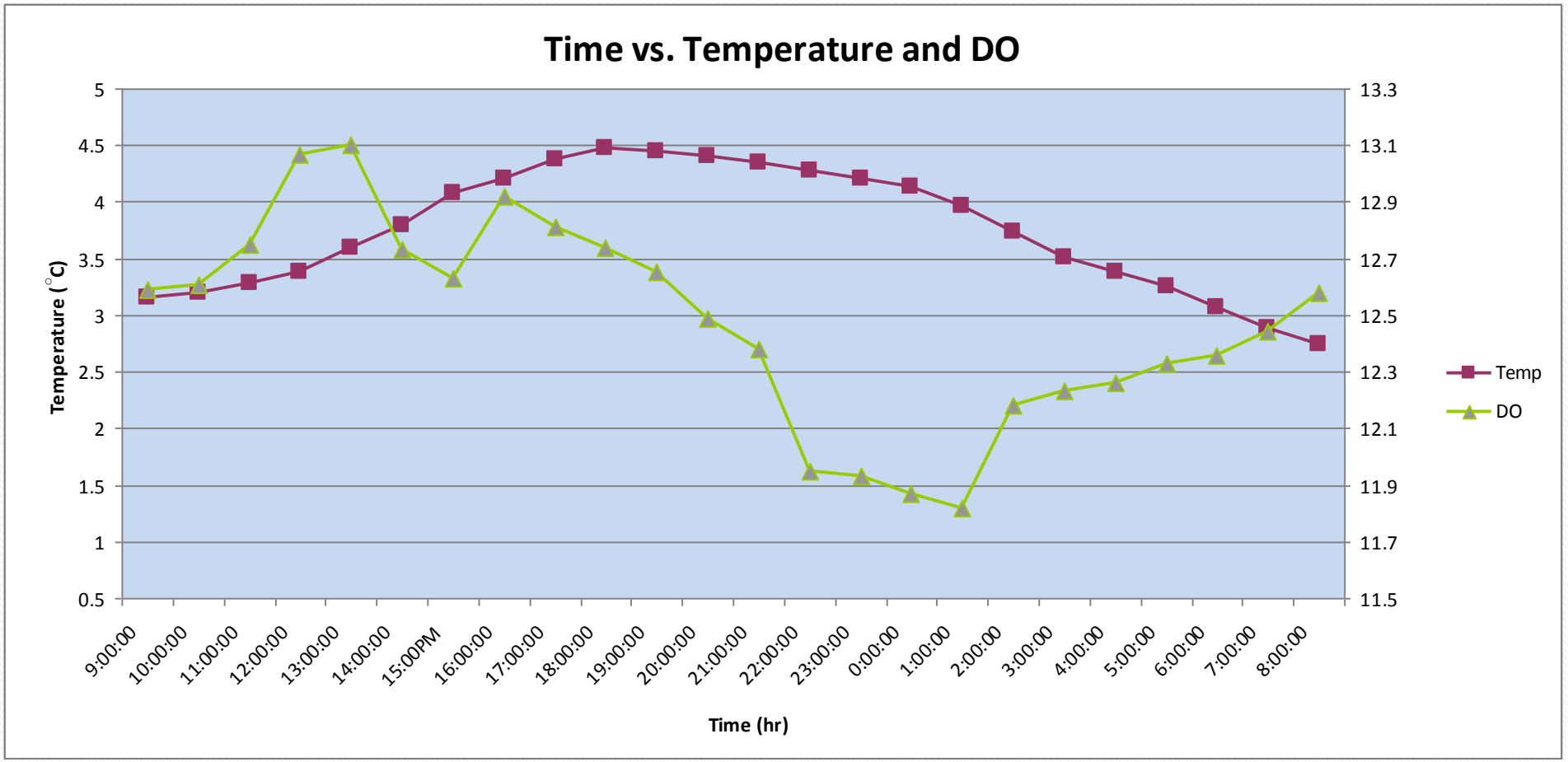

Time vs. Temperature
Temperature (°C)
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
9:00:00
10:00:00
11:00:00
12:00:00
13:00:00
14:00:00
15:00PM
16:00:00
17:00:00
18:00:00
19:00:00
20:00:00
21:00:00
22:00:00
23:00:00
0:00:00
1:00:00
2:00:00
3:00:00
4:00:00
5:00:00
6:00:00
7:00:00
8:00:00
Time (hr)
Temp


Time vs. DO
Dissolved Oxygen (mg/L)
14.5
14
13.5
13
12.5
12
11.5
11
10.5
9:00:00
10:00:00
11:00:00
12:00:00
13:00:00
14:00:00
15:00PM
16:00:00
17:00:00
18:00:00
19:00:00
20:00:00
21:00:00
22:00:00
23:00:00
0:00:00
1:00:00
2:00:00
3:00:00
4:00:00
5:00:00
6:00:00
7:00:00
8:00:00
Time (hr)
DO


Time vs. pH
10.7
10.65
10.6
10.55
10.5
10.45
10.4
10.35
pH (Units)
10:00:00
11:00:00
12:00:00
13:00:00
14:00:00
15:00PM
16:00:00
17:00:00
18:00:00
19:00:00
20:00:00
21:00:00
22:00:00
23:00:00
0:00:00
1:00:00
2:00:00
3:00:00
4:00:00
5:00:00
6:00:00
7:00:00
8:00:00
Time (hr)
pH

Time vs. Spec. Conductance




Time vs. Temperature and DO
Temperature (°C)
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
13.3
13.1
12.9
12.7
12.5
12.3
12.1
11.9
11.7
11.5
9:00:00
10:00:00
11:00:00
12:00:00
13:00:00
14:00:00
15:00PM
16:00:00
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20:00:00
21:00:00
22:00:00
23:00:00
0:00:00
1:00:00
2:00:00
3:00:00
4:00:00
5:00:00
6:00:00
7:00:00
8:00:00
Time (hr)
Temp
DO

Chemical Properties Ranges and Average

	Range	Average
DO	11.82-13.1	12.48
pH	10.4-10.66	10.51
Temp	2.75-4.48	3.74
Sp. Cond.	0.588-0.71	0.651

Water Quality Summary

- The water sampled was very basic with an average pH of 10.51, however it was observed that as temperature increased, the pH of the water became less basic. (There is a question of a Manta malfunction.)
- As temperature increases the water ionizes and can react with the Dissolved Oxygen, which can have the effect of lowering the conductivity of the water, which is why the water exhibited low conductivity levels during peak temperature times

Summary continued..

During daylight times, the Dissolved Oxygen was at its highest levels seeing as the suns rays would promote photosynthesis, which in turn releases oxygen into the water more during the day (which also contributed to high Dissolved Oxygen percent-saturation levels during daylight hours)